



Fermilab



KEK

The 20th ICFA Advanced Beam Dynamics Workshop on High Intensity and High Brightness Hadron Beams (ICFA-HB2002)

April 8-12, 2002, Fermilab, USA

PROGRAM (April 3, 2002)

Program

Monday, April 8

Morning	8:00 am	Registration	
	9:30 am – 12:30 pm	Plenary session (physics talks)	1West
Afternoon	2:00 pm – 6:00 pm	Plenary session (machine talks)	1West
Evening	6:00 pm	Reception	WH15

Tuesday, April 9

Morning	8:30 am – 12:30 pm	Parallel sessions
Afternoon	2:00 pm – 6:00 pm	Working groups

Wednesday, April 10

Morning	8:30 am – 12:30 pm	Parallel sessions
Afternoon	2:00 pm – 6:00 pm	Working groups

Thursday, April 11

Morning	8:30 am – 12:30 pm	Parallel sessions	
Afternoon	2:00 pm – 6:00 pm	Plenary session (physics reports; summaries)	1West
Evening	6:00 pm	Cash bar at User's Center	
	7:00 pm	Dinner at Chez Leon	

Friday, April 12

Morning	8:30 am – 12:30 pm	Plenary session (summaries, cont'd)	1West
Afternoon	1:30 pm – 4:00 pm	Fermilab tour	
	4:00 pm – 5:00 pm	Wine and cheese seminar	1West

Parallel Sessions

Tuesday, April 9, morning	8:30 am – 12:30 pm	
A. Lattice		Comitium (WH2SE)
B. Beam loss, collimation, and shielding		Curia II (WH2SW)
C. and G. Joint Session - FFAG and Cyclotrons		1North
D. New ideas		1East
Wednesday, April 10, morning	8:30 am – 12:30 pm	
E. Space charge simulations		Curia II (WH2SW)
F. Remote handling		1East
G. (Joint with Session C on Tuesday)		
H. Ion sources		1North
Thursday, April 11, morning	8:30 am – 12:30 pm	
I. Space charge experiments		Curia II (WH2SW)
J. Hadron beam cooling		Comitium (WH2SE)
K. H ⁻ stripping		1East
L. Electron cloud effects		1North

Working Groups

Tuesday, April 9, afternoon	2:00 pm – 6:00 pm	
Wednesday, April 10, afternoon	2:00 pm – 6:00 pm	
WG I: Circular Accelerators		Curia II (WH2SW)
• Machine design reports		
• Injection, painting and extraction		
• Beam dynamics issues (brightness preservation, noise, instabilities)		
• Hardware (magnet, power supply, RF, vacuum, kicker)		
• Diagnostics		
WG II: Linear Accelerators		1North
• Machine design reports		
• Beam dynamics issues (brightness preservation, halo formation)		
• Hardware (RFQ, chopper, normal conducting RF, superconducting RF)		
• Diagnostics		
WG III: Beamlines and Targets		1East

Presentations

Monday, April 8

Morning - Plenary Session, 1West

Chair: Paul Lisowski (LANL)

Secretary: Mikhail Kostin (Fermilab)

9:30 am Opening address

9:45 am JHF physics

K. Stanfield (Fermilab)

J. Imazato (KEK)

10:30 am Coffee break

11:00 am Neutrino physics

11:45 am Muon physics

D. Michael (CalTech)

W. Molzon (UC Irvine)

12:30 pm Lunch break

Afternoon - Plenary Session, 1West

Chair: Andy Sessler (LBL)

Secretary: Meiqin Xiao (Fermilab)

2:00 pm Introductory remarks: Reflections on the
reasons for building accelerators

2:15 pm JHF machines

2:55 pm Synchrotron based proton drivers

A. Sessler (LBL)

Y. Mori (KEK)

W. Chou (Fermilab)

3:35 pm Coffee break

4:00 pm SNS Project

4:40 pm Linac based proton drivers

5:20 pm An 8 GeV SC proton linac

J. Wei (BNL/ORNL)

T. Wangler (LANL)

W. Foster (Fermilab)

6:00 pm Reception at 15th Floor, Wilson Hall

Tuesday, April 9

Morning - Parallel Sessions: 8:30 am – 12:30 pm, coffee break 10:15 am – 10:45 am

A. *Lattice, Comitium (WH2SE)*

Convener: Arch Thiessen (LANL)

Secretary: Bela Erdelyi (Fermilab)

1. JHF lattice
2. Tracking studies for JHF lattice
3. Proton driver lattice
4. Tracking of proton driver lattice

Kenta Shigaki (JAERI)

A. Molodojentsev (KEK)

C. Johnstone (Fermilab)

Bela Erdelyi (Fermilab)

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| <ol style="list-style-type: none"> 5. AHF lattices 6. Tracking AHF lattices 7. Magnets that meet tracking requirements for AHF
 8. SNS Ring lattice 9. Lattice design studies for CERN Proton Driver Accumulator and Compressor | Peter Schwandt (Indiana U.)
Filippo Neri (LANL) |
| | Martin Schulze et al.
(General Atomics)
J. Wei et al. (BNL) |
| | Christian Carli et al. (CERN) |
| B. Beam Loss, Collimation, and Shielding, Curia II (WH2SW) | |
| <i>Convener: Nikolai Mokhov (Fermilab)</i> | |
| <i>Secretary: Mikhail Kostin (Fermilab)</i> | |
| <ol style="list-style-type: none"> 1. Fermilab Booster beam loss and collimation 2. SNS beam-in-gap cleaning and collimation
 3. Beam loss control on the ESS Accumulator Rings 4. Radiation handling in the slow extraction of the JHF 50 GEV ring
 5. Beam collimation and shielding in the Fermilab Proton Driver
 6. Shielding calculations for the SNS proton beam transport system 7. Development of high-power target systems for the SNS and the muon collider/neutrino factory 8. Beam loss and collimation at the LHC | R. Webber (Fermilab)
Sarah Cousineau et al.
(ORNL/BNL) |
| | C. Warsop (RAL) |
| | M. Tomizawa, T. Yokoi
(KEK) |
| | A. Drozdin, N. Mokhov
(Fermilab) |
| | J. Johnson et al. (ORNL) |
| | T. Gabriel et al. (ONAL)
J.B. Jeanneret (CERN) |
| C. and G. Joint Session - FFAG and Cyclotrons, 1North | |
| <i>Conveners: Y. Mori (KEK), P. Schmelzbach (PSI), R. Baartman (TRIUMF)</i> | |
| <i>Secretary: Krishnaswamy Gounder (Fermilab)</i> | |
| <ol style="list-style-type: none"> 1. The PSI cyclotron and its extrapolation to a 10 MW driver 2. High intensity cyclotron development at IBA 3. FFAGs: scaling and isochronous 4. Development of FFAG at KEK 5. Beam dynamics of FFAG accelerators 6. FFAG for neutrino factory 7. RF acceleration in FFAG muon accelerator 8. Stochastic cooling in FFAG | P. Schmelzbach (PSI)
Yves Jongen (IBA)
R. Baartman (TRIUMF)
Y. Mori (KEK)
M. Aiba (KEK)
C. Johnstone (Fermilab)
S. Koscielniak (TRIUMF)
M. Wakasugi (RIKEN) |
| D. New Ideas, 1East | |
| <i>Conveners: Ken Takayama (KEK), Chuck Ankenbrandt (Fermilab)</i> | |
| <i>Secretary: Vincent Wu (Fermilab)</i> | |

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| 1. Superbunch acceleration and induction devices | J. Kishiro et al. (KEK) |
| 2. Beam echo in hadron accelerators | G. Stupakov (SLAC) |
| 3. Beam echo experiment | P. Colestock (LANL) |
| 4. Inductive inserts | J. Griffin (Fermilab) |
| 5. Slip stacking | J. Steimel, K. Koba
(Fermilab) |
| 6. Barrier rf stacking | B. Ng (Fermilab) |
| 7. Barrier bucket experiment in the Recycler | C. Bhat (Fermilab) |
| 8. Afterburner | M. Popovic (Fermilab) |

Afternoon – Working Groups: 2:00 pm – 6:00 pm, coffee break 3:45 pm – 4:15 pm

WG I: Circular Accelerators, Curia II (WH2SW)

Convenors: Lee Teng (ANL), Roberto Cappi (CERN)

Secretary: Alexey Burov (Fermilab)

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| 1. 3-GeV ring at the JHF | Fumiaki Noda (JAERI) |
| 2. AGS high power upgrade plan | W.T. Weng (BNL) |
| 3. AHF project | A. Thiessen (LANL) |
| 4. High density and high intensity beams
at CERN-PS: present studies, achievements
and future goals | R. Cappi (CERN)
E. Shaposhnikova (CERN) |
| 5. Results from impedance reduction in the SPS | |
| 6. Emittance dilution in HERA-p: lessons and
overview | R. Wanzenberg (DESY) |
| 7. Multiparticle dynamics in the E-phi tracking
code ESME : resources and results | J. MacLachlan (Fermilab) |
| 8. Application of the UAL to high-intensity beam
dynamics studies in the SNS ring | N. Malitsky et al. (BNL) |
| 9. Longitudinal dynamics and rf hardware | M. Yoshii (KEK) |
| 10. Diagnostic investigation of tune and tune
shift in the IPNS RCS | J. Dooling et al. (ANL) |
| 11. Hardware of beam injection and extraction | Y. Shirakabe (KEK) |
| 12. Magnet and power supply | M. Muto (KEK) |
| 13. Beam profile monitor of high intensity proton | Y. Hashimoto (KEK) |
| 14. Magnets for high beam power synchrotrons | F. Ostiguy (Fermilab) |
| 15. Dual-harmonic resonant power supply | C. Jach (Fermilab) |
| 16. Proton Driver vacuum system | T. Anderson (Fermilab) |

WG II: Linear Accelerators, INorth

Convenors: Jean-Michel Lagniel (CEA), Roland Garoby (CERN)

Secretary: Xiaolong Zhang (Fermilab)

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| 1. Aspects of beam behavior in different
sections of the SNS linac | S. Nath (LANL) |
| 2. High-intensity proton linac for the KEK/JAERI
joint project | M. Ikegami et al. (KEK) |
| 3. ESS linac design overview | R. Ferdinand et al. (CEA) |

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| 4. Status and plans of the SPL study at CERN
5. The TRASCO project
6. IFMIF a challenging high intensity accelerator
7. An RFQ designed to accept beam from a weak focusing LEBT
8. Measurement of beam halo generation in an intense proton beam
9. Wide dynamic-range beam-profile instrumentation for a beam-halo measurement: description and operation
10. MRTI codes and linac designs
11. Numerical code in use in CEA-Saclay
12. Modeling of mismatch induced emittance growth in linacs

13. Halo and beam dynamics issues in high power linacs | R. Garoby (CERN)
C. Pagani (INFN)
R. Ferdinand et al. (CEA)

L. Young (LANL)

P. Colestock et al. (LANL)

J.D. Gilpatrick et al. (LANL)
B. Bondarev (MRI-Moscow)
N. Pichoff et al. (CEA)

I. Hofmann, G. Franchetti (GSI)

N. Pichoff et al. (CEA) |
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WG III: Beamlines and Targets, 1East

Convenors: Craig Moore (Fermilab), Kirk McDonald (Princeton U.)

Secretary: Alberto Marchionni (Fermilab)

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| 1. Target development for the SINQ high-power neutron spallation source
2. Carbon and beryllium targets and beam windows at PSI
3. NuMI target
4. Mercury target
5. Radiation protection utilizing electronic berms
6. Automatic beam line tuning (AUTOTUNE)
7. Sophisticated beam permit system
8. Tails of beam distribution
9. Beam transfer lines for the SNS
10. Targetry issues for the Fermilab 2 MW neutrino superbeam | W. Wagner (PSI)

Gerd Heidenreich (PSI)
James Hylen (Fermilab)
K. McDonald (Princeton U.)
John Anderson (Fermilab)
T. Kobilarcik (Fermilab)
R. Ducar (Fermilab)
A. Marchionni (Fermilab)
D. Raparia (BNL)

M. Kostin (Fermilab) |
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Wednesday, April 10

Morning - Parallel Sessions: 8:30 am – 12:30 pm, coffee break 10:15 am – 10:45 am

E. Space Charge Simulations, Curia II (WH2SW)

Convenors: Ingo Hofmann (GSI), Rob Ryne (LBL)

Secretary: Bela Erdelyi (Fermilab)

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| 1. ORBIT: A code for collective beam dynamics in high intensity rings

2. Behavior of intense beams simulated with | S. Cousineau, J. Holmes (ORNL) |
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Simpsons 3. Coherent transverse resonance effects 4. Space charge calculation in the code ORBIT 5. Simulation studies with PATRASH 6. Space charge effects on beam loss due to resonance overlap 7. Resonance tests of space charge	S. Machida (KEK) I. Hofmann (GSI) A.U. Luccio (BNL) Y. Shimosaki (KEK)
	G. Franchetti (GSI) J. Qiang, R. Ryne(LBL)
F. Remote Handling, 1East	
<i>Convener: Dave Pushka (Fermilab)</i> <i>Secretary: Mikhail Kostin (Fermilab)</i>	Eyke Wagner (PSI)
1. Remote handling and shielding at PSI 2. Remote handling experience at LAMPF and LANSCE 3. Dose calculations and remote handling plan for NuMI	R. Werbeck (LANL) J. Hylen (Fermilab)
G. (Joint with Session C on Tuesday)	
H. Ion Sources, 1North	
<i>Conveners: Ka-Ngo Leung (LBL), Horst Klein (U. of Frankfurt)</i> <i>Secretary: Vincent Wu (Fermilab)</i>	V. Dudnikov (Fermilab) R. Keller et al. (LBL)
1. High brightness negative ion sources with high emission current density 2. Status of the SNS H ⁻ source and LEBT 3. Performance of the magnetron H source on the BNL 200 MeV linac 4. Towards high current steady state H sources 5. ECR ion source for negative ions	J. Alessi (BNL) B. Ellingboe (Dublin City U.) Alain Girard (CEA-Grenoble)
6. ECR ion sources and their roles in radioactive beam production 7. High current ECR source for protons and deuterons at Saclay 8. Review of a scaled Penning H ⁻ surface plasma source 9. The ISIS Penning source and the volume sources from Frankfurt and DESY for the production of H ions	Richard Pardo (ANL) Robin Ferdinand (CEA) J.D. Sherman et al. (LANL) J.W.G. Thomason (RAL)

Afternoon – Working Groups: 2:00 pm – 6:00 pm, coffee break 3:45 pm – 4:15 pm

WG I: Circular Accelerators (cont'd), Curia II (WH2SW)

WG II: Linear Accelerators (cont'd), 1North

WG III: Beamlines and Targets (cont'd), 1East

Thursday, April 11

Morning - Parallel Sessions: 8:30 am – 12:30 pm, coffee break 10:15 am – 10:45 am

I. Space Charge Experiments, Curia II (WH2SW)

Conveners: Shinji Machida (KEK), S.Y. Lee (Indiana U.)

Secretary: Bela Erdelyi (Fermilab)

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| 1. SC effects at the KEK PS Main Ring | S. Igarashi et al. (KEK) |
| 2. Intensity dependent emittance-exchange in a proton synchrotron | I. Sakai (KEK) |
| 3. Studies of the coherent half integer resonance at the PSR | S. Cousineau (Indiana U.) |
| 4. Inductive inserts experiment at the PSR | K-Y. Ng (Fermilab) |
| 5. New methods to create hollow bunches | Christian Carli (CERN) |
| 6. Space charge calculations at PSI | A. Adelmann (PSI) |
| 7. Intense beam experiment at the U. of Maryland Electron Ring | R. Kishek (U. of Maryland) |

J. Hadron Beam Cooling, Comitium (WH2SE)

Conveners: Vasily Parkhomchuk (INP), Sergei Nagaitsev (Fermilab)

Secretary: Vincent Wu (Fermilab)

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| 1. Limitations of ion beam brightness under electron cooling – theory and experiments | V. Parkhomchuk (INP) |
| 2. Plasma point of view on the electron cooling | V. Reva (INP) |
| 3. Report from the Fermilab electron cooling group | S. Nagaitsev (Fermilab) |

K. H⁻ Stripping, 1East

Conveners: Isao Yamane (KEK), Y.Y. Lee (BNL)

Secretary: Aimin Xiao (Fermilab)

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| 1. Motivation of this session | I. Yamane (KEK) |
| 2. Review on laser assisted stripping | Ugo Gastaldi (INFN) |
| 3. Feasibility of laser stripping via a broad Stark state for charge-exchange injection into a high intensity proton ring | I. Yamane (KEK)
Slava Danilov (ORNL) |
| 4. A novel solution for H ⁻ laser stripping | G. Cantatore et al. (INFN) |
| 5. PVLAS developments on Fabry-Perot resonators locked to CW lasers and suitable for laser assisted Lorentz stripping of H ⁻ beams | M. Borden et al. (LANL) |
| 6. Carbon stripping foil experience at PSR | |
| 7. Present status of development of carbon stripper foils at KEK | Isao Sugai et al. (KEK) |
| 8. The SNS strategy for H ⁻ stripping | Y.Y. Lee (BNL) |

L. Electron Cloud Effects, 1North

Conveners: Bob Macek (LANL), Hitoshi Fukuma (KEK)

Secretary: Meiqin Xiao (Fermilab)

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| 1. Electron cloud effects (ECE) at e ⁺ /e ⁻ machines
and electron cloud diagnostics | K. Harkay (ANL) |
| 2. Observation of ECE at the KEKB | Hitoshi Fukuma (KEK) |
| 3. Observation of ECE at the PSR | R. Macek et al. (LANL) |
| 4. Theory and simulation of ECE | Kazuhito Ohmi (KEK) |
| 5. Simulations of electron cloud generation in
the PSR and SNS | Mauro Pivi (LBL) |
| 6. Nonlinear delta-f simulation studies of e-p
two-stream instabilities | H. Qin (PPPL) |
| 7. ECE in high-intensity proton machines | J. Wei (BNL) |
| 8. ECE in the KEK PS and the JHF project | T. Toyama et al. (KEK) |

Afternoon – Plenary Session, 1West

Chair: Yoshi Mori (KEK)

Secretary: Martin Hu (Fermilab)

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| 2:00 pm | Report from Fermilab physics study group | M. Velasco (Northwestern U) |
| 2:30 pm | Report from BNL neutrino physics study
group | W. Marciano (BNL) |
| 3:00 pm | Progress in bright ion beams for medicine,
industry and fusion | J. Kwan (LBL) |
| 3:30 pm | Workshop photo session | |
| 3:40 pm | Coffee break | |
| 4:00 pm | Summary of Session A | |
| 4:20 pm | Summary of Session B | |
| 4:40 pm | Summary of Session C and G | |
| 5:00 pm | Summary of Session D | |
| 5:20 pm | Summary of Session E | |
| 5:40 pm | Summary of Session F | |
| 6:00 pm | Cash bar at User's Center | |
| 7:00 pm | Dinner at Chez Leon | |

Friday, April 12

Morning - Plenary Session, 1West

Chair: Weiren Chou (Fermilab)

Secretary: Sergei Seletskiy (Fermilab)

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| 8:30 am | Summary of Session H |
| 8:50 am | Summary of Session I |
| 9:10 am | Summary of Session J |

9:30 am Summary of Session K
9:50 am Summary of Session L

10:10 am Coffee break

10:40 am Summary of Working Group I
11:10 am Summary of Working Group II
11:40 am Summary of Working Group III
12:10 pm Closing remarks

S. Holmes (Fermilab)

12:20 pm Lunch break

Afternoon

1:30 pm – 4:00 pm Fermilab Tour: MCR, A0, NLC, LHC magnets, Electron Cooling
Guides: Kiyomi Koba and Zubao Qian

4:00 pm Wine and cheese seminar, 1West
From Snowmass to ICFA – Status of the
Proton Driver Studies

W. Chou (Fermilab)

5:00 pm Adjourn